

## Converging Remote Sensing and Data Assimilation Techniques: A Data Fusion Approach for Near-real-time 4D Global Analyses

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A new approach to data fusion is under development as part of a pilot project at the National Oceanic and Atmospheric Administration's (NOAA) Center for Satellite Applications and Research (STAR). This approach leverages NOAA's current data assimilation (DA) systems and incorporates satellite remote sensing algorithms in order to create an observation-driven, 4D, global analysis. The system presented here utilizes a comprehensive set of observations from the current global observing system, including those from both satellite (radiance) and conventional (in-situ) sources. The data fusion system has three main components: a pre-processor that combines multiple satellite retrieval algorithms to adjust DA background fields and provide observation quality control and field/boundary constraints, a 3DVAR DA using Gridpoint Statistical Interpolation (GSI), and a post-processor which includes diagnosed products based on the analyzed fields. The data fusion tool is able to provide hourly, observation-driven analyses at 30km resolution (with the potential of increasing to sub-hourly, 15km grids) over the global domain. The analysis includes the traditional suite of remote sensing products (e.g. soundings, precipitable water, rainfall rate, cryospheric parameters, trace gases), as well as a number of added-value products (e.g. vorticity, geopotential height, stability parameters). In addition to producing hourly analyses, the data fusion tool is also capable of providing relevant information regarding satellite data quality, such as the data age, coverage, and its convergence (i.e. the analysis fit to the satellite observations), to better inform the operational user about the analysis quality. The availability of a tool that fuses data from multiple satellite and conventional sources and provides consistent geophysical parameters that fit those observations, on a global scale, should prove beneficial for situational awareness and short-term forecast guidance.